

Surface Storage – CALFED

The CALFED Record of Decision identified five potential surface storage reservoirs that are being investigated by the California Department of Water Resources, U.S. Bureau of Reclamation, and local water interests. Implementation of one or more of the potential reservoirs would be part of CALFED's long-term comprehensive plan to restore ecological health and improve water management for beneficial uses of the Bay-Delta. The five surface storage projects under investigation are:

- Sites Reservoir (North-of-the-Delta Offstream Storage)
- In-Delta Storage
- Shasta Lake Enlargement (Shasta Lake Water Resources Investigation)
- Los Vaqueros Reservoir Enlargement
- Millerton Lake Enlargement or a functionally equivalent storage program in the region (Upper San Joaquin River Basin Storage Investigation)

The surface storage regional/local strategy gives a broader background of surface storage in California that may also be helpful to the reader related to the following discussion of CBD Surface Storage. Details and project-specific descriptions of the investigations can be found in the California Bay-Delta Surface Storage Program Progress Report in Volume 4, Reference Guide.

Current Status of CALFED Surface Storage

A multidisciplinary CALFED interagency team originally began with a list of 52 potential reservoir sites and screened those to 12 sites that appeared to contribute to CALFED goals and satisfy CALFED solution principles, objectives, and policies. Sites smaller than 200,000 acre-feet of storage were considered too small to materially contribute to the program. In addition, CALFED policy focused on offstream reservoir sites and consideration of existing reservoir expansions. The five storage investigations identified in the ROD appeared to be more promising in their ability to contribute to CALFED's ecosystem, water quality, flood control and water supply objectives. Planning for the five CALFED-directed investigations has made varying levels of progress. Each investigation is considering a reasonable range of alternatives. Current timelines have targeted 2006 – 2008 for completing the planning documents. Essentially, the planning consists of project formulation, environmental documentation and engineering design. As relevant and useful information

becomes available, both stakeholders and the public are notified to ensure that a broad array of input and response are incorporated into the planning activities and documentation. More specifically, as project costs, environmental effects, and benefits are compiled, regulators, the public, and ultimately decision-makers will be asked to respond to the evaluations and conclusions.

Ongoing Surface Storage Investigations

The planning process for surface storage is both comprehensive and demanding. The CALFED surface storage investigations have been developed to comply with both the state and federal environmental laws, which require extensive documentation and public involvement. In addition, implementation of any one would likely require more than 30 regulatory permits and compliances. The timing and size limitations of the characterizations here are both incomplete and brief. Both the environmental laws and the permits and compliances will allow the public to participate in a more comprehensive and informed manner and on specific issues at the appropriate time. For more information related to public involvement in the investigations, visit www.storage.water.ca.gov/index.cfm

The five investigations are being completed under the programmatic direction provided by the CALFED ROD and the CBD Authority. The ROD includes a number of Implementation Commitments and Solution Principles to guide potential project implementation. For example, a fundamental philosophy of the CALFED Program is that costs should, to the extent possible, be paid by the beneficiaries of the program actions. The CALFED Program has also provided a forum for independent scientific review of important project-related issues through development of a Science Program with expert panels. In addition, the CBD agencies have committed to science-based adaptive management that would allow their facilities operations to be modified as understanding of issues improves or new issues are identified.

Two locally developed reservoirs, Los Vaqueros in northern California and Diamond Valley in the southern state, have been completed within the past six years are examples of offstream surface storage development. CALFED's program focus on offstream reservoirs or expansion of existing facilities, highlights the desire to reduce or avoid significant environmental effects. In addition, the use or objectives of Los Vaqueros (100,000 acre-feet capacity) and Diamond Valley, (800,000 acre-feet capacity) have focused on benefits other than the traditional energy generation, flood control, and water supply. The primary benefits of these new reservoirs are related to water quality, system flexibility, and system reliability against catastrophic events and droughts. More specifically, water supply augmentation is not a primary objective of either reservoir. The CALFED surface storage investigations reflect a similar approach, identifying the need for system flexibility and water quality. However, the ROD also identified water supply reliability and ecosystem restoration as primary surface storage objectives as well.

Los Vaqueros and Diamond Valley Reservoirs

Los Vaqueros and Diamond Valley help illustrate a potential misunderstanding of benefits in applying traditional economic evaluation methods to surface storage planning efforts. Traditional economics would evaluate storage projects based on cost per acre-foot of water supply improvement. Since these projects were constructed for other benefits, the "yields" of these reservoirs are incidental. Traditional cost per acre-foot evaluation would generate almost infinite unit cost. Similarly, application of traditional water supply economics for surface storage is likely not appropriate in many cases, including the CALFED surface storage investigations that focus on operational flexibility, water quality, environmental flows or other nontraditional benefits.

A common assumptions process has been developed to assure that the CBD Surface Storage analyses use a consistent basis for comparison, and that the planning assumptions are based on the most current rules, regulations, and operations. All five surface storage investigations will use a common set of existing and future no-action baseline conditions for assessing the feasibility, benefits, and impacts of the various projects. However, the CBD Surface Storage Program cannot wait for final key milestone project decisions such as recently considered proposed operational agreements before incorporating common assumptions into its models. The program will begin using the best available assumptions for all five storage projects. As assumptions require revisions, the projects will adopt the new assumptions in future studies.

Work completed on the five investigations over the past several years is approaching a point where this initial information on project performance and costs can be provided to local and regional agencies. The investigations are now developing operational scenarios that will allow potential beneficiaries the ability to assess their interest in specific projects. Bay-Delta Authority staff, along with federal and State agencies, are developing a conceptual finance plan, including disclosure of state and federal policies for

repayment of project benefits and a determination of project features and operations that benefit the entire State. This effort will include a variety of possible financing mechanisms and cost allocation methods.

Potential Benefits from CALFED Surface Storage

CALFED noted that perhaps the greatest benefit of new surface storage would be the operational flexibility that storage adds to the currently constrained system. The Bay-Delta system provides water for a wide range of needs, including in-stream flows for aquatic species, riparian habitat, wetlands, as well as benefits to municipal, industrial, and agricultural users. These often competing demands have restricted the operational flexibility of the SWP and CVP systems and consequently negatively impacted the quantity, quality, and timing of deliveries. The inflexibility and resulting consequences are then passed along to water users that are partially or wholly dependent upon the operations or deliveries of the CVP and SWP systems. By storing additional water, new surface storage can contribute to improved operational flexibility in the SWP and CVP systems and associated users for the enhanced statewide water resources benefits described below.

Each of the five surface storage reservoirs could be used to improve water supply reliability. The surface storage projects could also improve source water quality directly or facilitate blending of water from different sources. New surface storage can help provide water for the CALFED Environmental Water Account and other environmental needs. New surface storage can also help reduce the risk associated with potential future climate change by mitigating the effects of a relatively smaller seasonal snowpack storage capacity. Implementation of individual surface storage reservoirs could augment average annual water deliveries by anywhere from a negligible amount to over 400,000 acre-feet (according to initial operations simulations), depending on the mix of benefits selected by beneficiary agencies and operational considerations.

The total amount of potential water supply improvements from implementation of all five surface storage projects is unknown since a cumulative operations study has not yet been modeled. A cumulative study will be part of the common assumptions effort. However, initial model simulations show that the potential reservoirs could provide a wide range of type and geographic scope of benefits including agricultural, ecosystem, and urban uses, improvement of Delta water quality for both the ecosystem and Delta users and exporters, improvement of streamflows during times critical for fisheries and other ecosystem processes, flexibility for changing the timing of existing diversions to protect fisheries, and other water management purposes.

Other strategies can be more effective with additional storage. For example, water transfers can be more easily accommodated if water can be stored temporarily and then released from upstream storage at appropriate times and the receiving areas have capacity to store the transferred water. In addition, surface storage can improve the effectiveness of conjunctive water management strategies by more effectively capturing runoff that can ultimately be stored in groundwater basins.

Potential Costs of CALFED Surface Storage

Funding for the CALFED surface storage investigations has been provided by Federal and State funding sources, including voter-approved bond funds. A total of \$69.3 million (\$46.7 million State, \$22.6 million Federal) has been spent on the five CBD Surface Storage investigations from fiscal years 2000-2001

through 2003-2004. DWR and Reclamation will need an estimated additional \$40.9 million in study funding through 2005-2006.

New feasibility engineering cost estimates are in various stages of development for each of the five surface storage investigations. Costs will depend on project selected objectives and configurations. The estimated capital cost for developing the individual surface storage projects identified in the CALFED ROD could range from \$180 million for the smallest Shasta Lake Expansion, to \$2.4 billion for Sites Reservoir with the most extensive conveyance facilities; the least expensive configuration of Sites Reservoir could be about half as much as the most expensive. These costs do not include anticipated annual costs such as operations and maintenance, power, or costs associated with the use of existing facilities. As the investigations continue to move forward, more complete descriptions of costs and more specific allocation of benefits will allow an economic evaluation where costs can be assigned to specific beneficiaries and benefits. Under CALFED's "beneficiaries pay" concept, all beneficiaries including water quality, environmental, system flexibility, and water supply reliability beneficiaries would pay for their share of each project's benefits. Implementation of any of the five potential surface storage projects would likely include some state and federal public funding to pay for public benefits.

Major Issues Facing CALFED Surface Storage

Identification of Beneficiaries

While the ROD identified potential project purposes for the five surface storage projects, it did not specify how those benefits would be distributed, who would receive them, or how the costs of the projects would be allocated. To comply with federal and state planning requirements, DWR and Reclamation must identify more specific project purposes, operational plans, and end uses of benefits that could be developed by the projects. While this will require the active participation of local and regional water agencies, those agencies must have initial information on the benefits the projects might provide and the potential costs that might be allocated to them before they can be expected to engage.

Funding

The surface storage analyses, planning documentation, and permitting require major investments. Providing continuity of funding over the long development period is a major challenge. After fiscal year 2003-2004, less than \$20 million from relatively stable State funding sources will be available for work on the five storage projects. To date, Federal funding has been a limiting factor in meeting the ROD schedules. Inadequate funding extends schedules and raises time dependent expenses, resulting in increased project costs. Without sufficient and stable funding, prioritization and potential deferral of specific projects may be required.

Impacts

New surface storage can cause impacts within the reservoir inundation area affecting the existing environment and human uses, economic impacts for the surrounding community, and flow impacts both up and downstream of diversions. A number of social and economic effects are being considered in the investigations such as loss of agricultural lands, changes to the mix and type of jobs, and loss of property tax revenue to local governments. The surface storage investigations are also considering environmental effects such as potential impacts to stream flow regimes, potential adverse effects to a protected stream, potential water quality effects, potential changes in stream geomorphology, and loss or conversion of fish and wildlife habitat. New surface storage projects may need to address impacts under the application of various laws, regulatory processes and statutes including Public Trust Doctrine, Area of Origin statutes,

CEQA, NEPA, the Clean Water Act and the Endangered Species Acts. More specific descriptions of the types of potential impacts associated with the five investigations are noted in the Progress Report (see Volume 4, Reference Guide) of the five surface storage investigations. As noted in the Record of Decision, decisions to construct surface storage will be predicated on compliance with all environmental review and permitting requirements.

Recommendations to Help Promote Implementation of CALFED Surface Storage

1. CALFED signatories and stakeholders should finish the feasibility and environmental studies of the five potential surface storage projects identified in the CALFED ROD.
 - The investigations should continue to test all five potential projects against CALFED Solution Principles and Implementation Commitments as well as other local, state, and federal planning criteria for deciding to move to construction of any projects.
 - Engage more stakeholders and potential project beneficiaries in the process.
 - Develop complete information on how the projects could be operated for a variety of purposes, costs, and impacts.
 - Continue evaluation and presentation of operational scenarios that will allow potential beneficiaries to assess their interest in specific projects.
 - Develop mechanisms to provide assurances that projects will be operated in a manner consistent with the objectives.
2. The CDBP, DWR, and Reclamation should continue their development of conceptual finance plans that will include descriptions of relevant State and Federal financial policies and a determination of the potential for State and Federal investment in benefits to the general public. The scenarios and finance plans will help facilitate potential investment decisions by local, regional, State and Federal decision-makers.

Information Sources

- CALFED Programmatic EIS/EIR and ROD
- North-of-the-Delta Offstream Storage Investigation Progress Report July 2000
- North-of-the-Delta Offstream Storage Scoping Report, October 2002
- Initial Surface Water Storage Screening Report, CALFED August 2000
- Contra Costa Water District's Draft Project Concept Report, CALFED August 2002
- In-Delta Storage Program Draft Summary Report and supplemental reports on operations, water quality, engineering, environmental, and engineering evaluations May 2002
- Flow Regime Requirements for Habitat Restoration along the Sacramento River between Colusa and Red Bluff, Revised February 14, 2000
- Upper San Joaquin River Basin Storage Investigation Draft Phase 1 Investigation Report In-Progress Review, Initial Surface Storage Options Screening, November 2002
- Shasta Lake Water Resources Investigation Mission Statement Milestone Report, March 2003
- California Bay-Delta Surface Storage Program Progress Report, April 2004